



ONR Electronic Warfare S&T Industry Day

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C4ISR Department
Office of Naval Research
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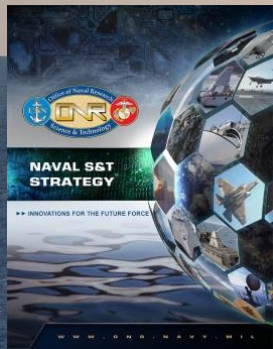


The Office of Naval Research

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- 23 Locations
- \$2.1B / year
- >1,000 Partners



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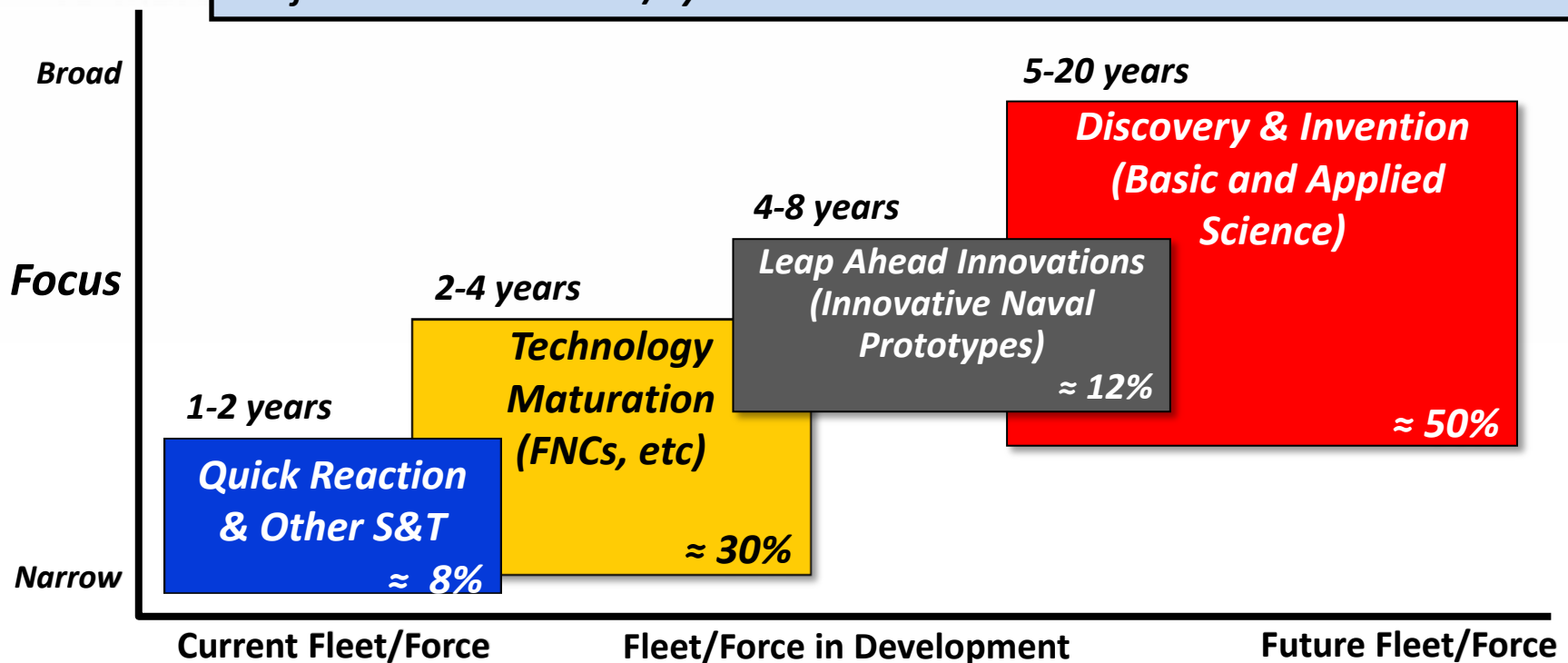
*Technological
Advantage*





Warfighting Capabilities Enabled by S&T Investments

- *Assure Access to Maritime Battlespace*
- *Autonomy & Unmanned Systems*
- ***Electromagnetic Maneuver Warfare***
- *Expeditionary & Irregular Warfare*
- *Information Dominance/Cyber*
- *Platform Design & Survivability*
- *Power & Energy*
- *Strike & Integrated Defense*
- *Warfighter Performance*



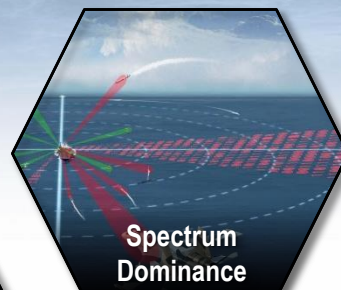
Portfolio is balanced across near, mid, and long term S&T investments

S&T Investment Priorities



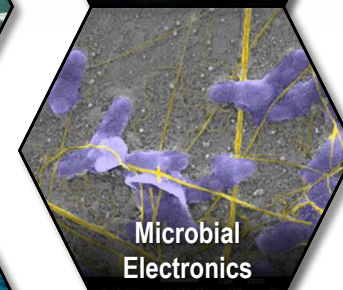
DIRECTED ENERGY / ELECTRIC WEAPONRY

CYBER



EM MANEUVER WARFARE

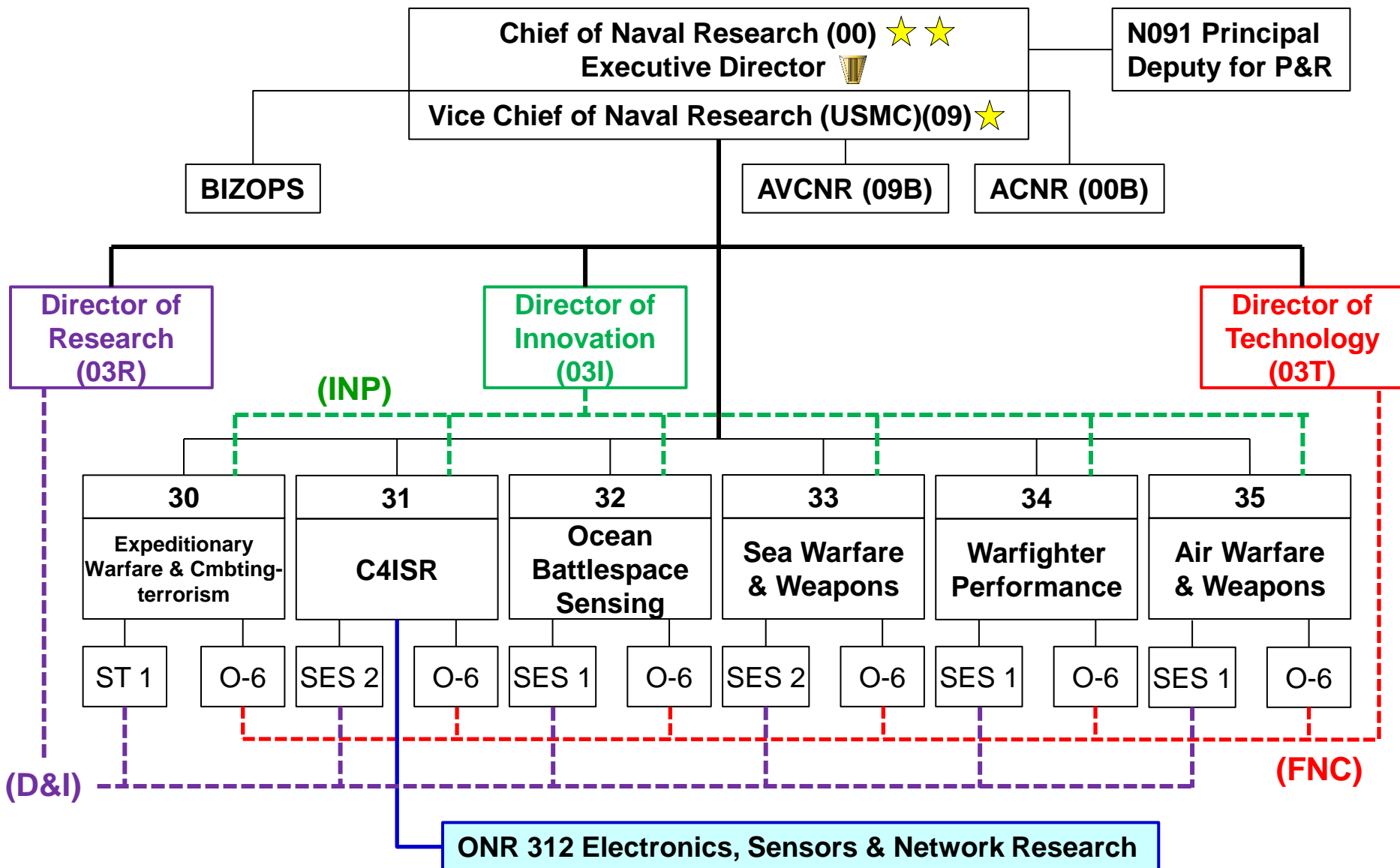
UxS MANEUVER WARFARE



SYNTHETIC BIOLOGY



Office of Naval Research Organization (S&T)

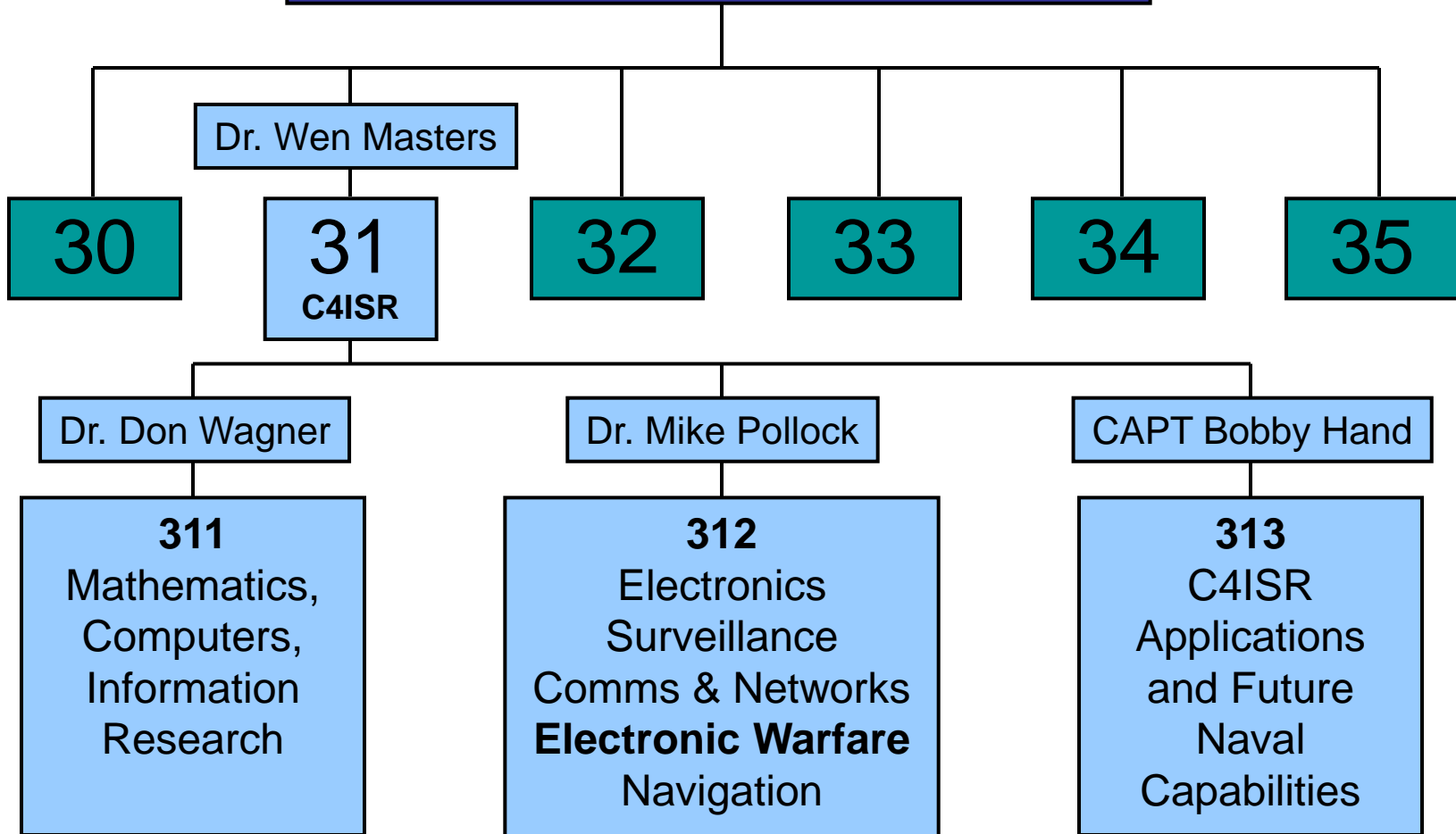




ONR Organization - S&T



Chief of Naval Research





ONR 312 Electronic Warfare



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Envisioneering

Mr. Tom Jesswein
Envisioneering

Mr. Don Ashford
ARL

6.2 Discovery & Invention

EO/IR Countermeasures
Wideband ES – Sensing/Processing
Enabling Cognitive & Adaptive EW
Spectrum Knowledge/Learning/
Reasoning/Attack

Multi-Band Lasers
Wideband EA – Components/Techniques
Technologies for High Throughput &
Rapidly Programmable EW Systems

Multi-Mode CM Techniques
High Power mmW Transmitters
Emulation Environments for Adaptive &
Targeted Electronic Warfare

Future Naval Capabilities (Sea Strike, Sea Shield, ForceNet & Expeditionary Maneuver Warfare)

Surface/Subsurface

EW Battle Management for Surface Defense
Scalable Integrated RF (SIRFSUP)
Multispectral EO/IR Countermeasures
against Advanced Threats (MEIRCAT)
Advanced Coordination Techniques for
Distributed EW (ACT DEW)

Air

Collaborative Electronic Attack (CA)
Multi-Spectral Seeker Defeat (MSSD)
Precision Electronic Attack
Technologies (PEAT)

Marine Corps

Future Joint Counter
Radio-Controlled IED EW

Innovative Naval Prototype
Nemesis



Doing Business with ONR



Business Opportunities

- Broad Agency Announcements (BAA)
- Small Business Innovative Research / Small Business Technology Transfer (SBIR/STTR)
- Multidisciplinary Research Program of the University Research Initiative (MURI)
- Defense University Research Instrumentation Program (DURIP)
- DoD Experimental Program to Stimulate Competitive Research (DEPSCOR)

Detailed information can be found on the ONR website

<http://www.onr.navy.mil/en/Contracts-Grants.aspx>



What is Electronic Warfare?

Joint Service Definition



Development of technologies that maximize the operational use of the electromagnetic (EM) spectrum by U.S. forces, ...while denying same from the enemy, ...by using EM means to detect and attack enemy sensor, weapon and command infrastructure systems

- Immediate battlespace recognition of hostile scenario/intent and optimized, automated response decisions**
- Electronic denial, degradation, disruption or destruction of enemy C4ISR, IADS, acquisition and associated targeting/weapon systems**
- Timely EM control over the entire battlespace: temporal, spectral, spatial**



Electronic Warfare in Perspective



The RED Kill Chain...



... and the Electronic Warfare Response Chain...



Situational Awareness/Threat Warning

Requires capability to:

- Continuously monitor all critical portions of the spectrum
- Quickly and accurately classify emitters/emitter function
- Provide specific emitter identification
- Precisely and rapidly locate platforms, events
- Conduct accurate long term monitoring/tracking
- Share key info in near real time

Counter Targeting/Jamming/ Self-Protection

Requires capability to selectively:

- Limit/deny access (jamming)
- Provide false/misleading information (countertargeting, decoys)
- Counter communications and networks
- Damage/degrade threat sensor capability



EW Networked Capabilities, Analysis & Assessment, Electronic Protection

Battlespace Awareness

Spectrum Control

Information Dominance



Electronic Warfare Terminology

DoD / JCS Definitions



Electronic Warfare (EW): “Any military action involving the use of EM radiation ... to control the EM spectrum or to attack the enemy.”

- **Electronic Warfare Support (ES):** Actions to search for, intercept, ID & locate intentional / unintentional EM sources for the purpose of immediate threat recognition
 - Provides information/data for immediate decisions regarding operations & tactical actions (avoidance, targeting, cueing)
- **Electronic Attack (EA):** Use of EM ... to attack with the intent of degrading, neutralizing or destroying enemy combat capability
 - Includes jamming, EM deception, decoys/expendables
- **Electronic Protection (EP):** Actions taken to protect ... from any effects of friendly or enemy employment of EW that degrade, neutralize, or destroy friendly combat capability



Electronic Warfare Terminology

Scope & Domain Boundaries within the EMS



Electronic Warfare: Military action involving the use of electromagnetic (EM) and directed energy to control the electromagnetic spectrum (EMS) or to attack the enemy.

Electromagnetic
Spectrum
Management

EP

Protect EM systems
against EM interference

EA

Degrade, disrupt, deceive, & deny
adversary EM system signals,
processing, and C2 functions

DE (EA)

Induced currents
or voltages

ES

Tactical sensing for
real-time response

ISR/SIGINT

Intelligence, Surveillance
and Reconnaissance
gathering systems

DE (Weapon)

Thermal / radiation
bombardment

PSYOP/MISO

Induce alarms or
failures / influence
ideology

Counter-DE

Protect non-EM system
against EM interference
and DE (Weapon)

C3

Command, Control and
Communications
(voice, data, info)

Cyber Attack

Operations intended to
manipulate adversary info
and/or cyber systems



ONR Electronic Warfare S&T Area Objectives



Dominate the Spectrum

Pervasive Spectrum Awareness - Know who is out there, where they are, and what they are doing...

Requires capability to:

- Continuously monitor all critical portions of the spectrum (RF/EO/IR)
- Quickly and accurately classify emitters/emitter function
- Provide Specific Emitter Identification (SEI)
- Precisely and rapidly locate platforms, people, things, events
- Conduct accurate long term monitoring/tracking
- Network sensors and share key info in near-real time

ES

Effective Spectrum Control - Determine who sees what...

Requires capability to selectively:

- Limit/deny access (jamming) (RF/EO/IR)
- Provide false/misleading information (countertargeting, decoys)
- Damage/degrade threat sensor capability (RF/EO/IR)

EA

Unrestricted Spectrum Access for Blue Forces – Protect our own ISR capabilities...

Requires capability to:

- Negate the impact of hostile jamming on U.S. and allied sensors (RF/EO/IR)
- Preserve the integrity of critical networks and data links
- Precisely navigate and target weapons in a GPS-denied environment

EP



ONR Portfolio Characteristics



	Direct Fleet Support / Quick Reaction	Future Naval Capability (FNC)	Innovative Naval Prototype	Discovery and Invention (D&I)
% of Portfolio	~8	>30	~12	~50
Focus	Solving emergent fleet / force needs	Transitioning mature S&T to acquisition program of record	Demonstrating Leap- ahead technology	Expanding frontiers of knowledge in areas of naval interest
Motivation	Fleet-identified need	OPNAV-identified capability gap	Significant military advantage	General Naval needs and opportunities
Example	IED Jammer	Enhanced NULKA Payload	Integrated Topside (INTOP)	Wideband GaN EW System Components
Type of Innovation	Disruptive or sustaining.	Sustaining - makes an existing capability better	Disruptive - makes an existing capability obsolete	Disruptive or sustaining.
Time frame	1-2 years	3-4 years	4-8 years	continuing
Typical TRL entry point	TRL-4 to TRL-5	TRL-3	TRL-2 to TRL-3	TRL-0 to TRL-2
Typical TRL end point	TRL-7	TRL-6	TRL-6	TRL-3 to TRL-4
Technical Difficulty	Medium	Medium	High	High
Operational Integration Complexity	Medium	Usually straightforward	High	N/A
Approval Level to start a program	ONR Corporate	Technology Oversight Group (3-Star)	DON Corporate Board (4-Star)	ONR Department



Technology Readiness Levels



1. **Basic principles observed and reported.** Example: Paper studies of a technology's basic properties.
2. **Technology concept and/or application formulated.** Example: Limited to analytical paper studies.
3. **Analytical and experimental critical function and/or characteristic proof of concept.** **D&I**
Example: Components that are not yet integrated or representative.
4. **Component and/or breadboard validation in laboratory environment.** Example: Integration of "ad hoc" hardware in a laboratory.
5. **Component and/or breadboard validation in relevant environment.** Example: "High fidelity" laboratory integration of components.
6. **System/subsystem model or prototype demonstration in a relevant environment.** Example: Testing a prototype in a high fidelity laboratory environment or in a simulated operational environment.
7. **System prototype demonstration in an operational environment.** Example: Testing the prototype in a test bed aircraft.
8. **Actual system completed and qualified through test and demonstration.** Example: Developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
9. **Actual system proven through successful mission operations.** Example: Using the system under operational mission conditions.



ONR EW S&T Development Process

Annual D&I Refresh



Sep - Oct

ONR EW S&T Future Vision

- Capability gaps (OPNAV guidance, NARG's)
- Roadmaps (S&T, Acquisition)
- Emerging threats (intell reporting)
- Technology trends (to avoid surprise)

Nov - Jan

- ### D&I BAA
- Industry
 - Academia

D&I Solicitation

 - NRL
 - Warfare Centers
 - FFRDC / UARC

February

Review White Paper Submissions

- Evaluate technical merits/innovation, Naval relevance, prior experience, cost realism
- Down-select roughly 2x \$\$ available

March - April

EW S&T Review (Gathering) – Invitation Only

Agenda:

- EW Requirements view (OPNAV, HQMC)
- EW Acquisition view (NAVSEA, NAVAIR, MCSDC)
- Briefings of current D&I, SBIR, FNC efforts
- Briefings of proposed D&I new starts for following FY

Actions:

- Invited reviewers advise on D&I new start selection
- Begin dialog regarding new FNC needs
- De-conflict with other service reps (Army, Air Force)

April - May

Select new D&I projects

- Request full proposals

Jun - Aug

- Initiate contract actions
- Prepare FM documentation

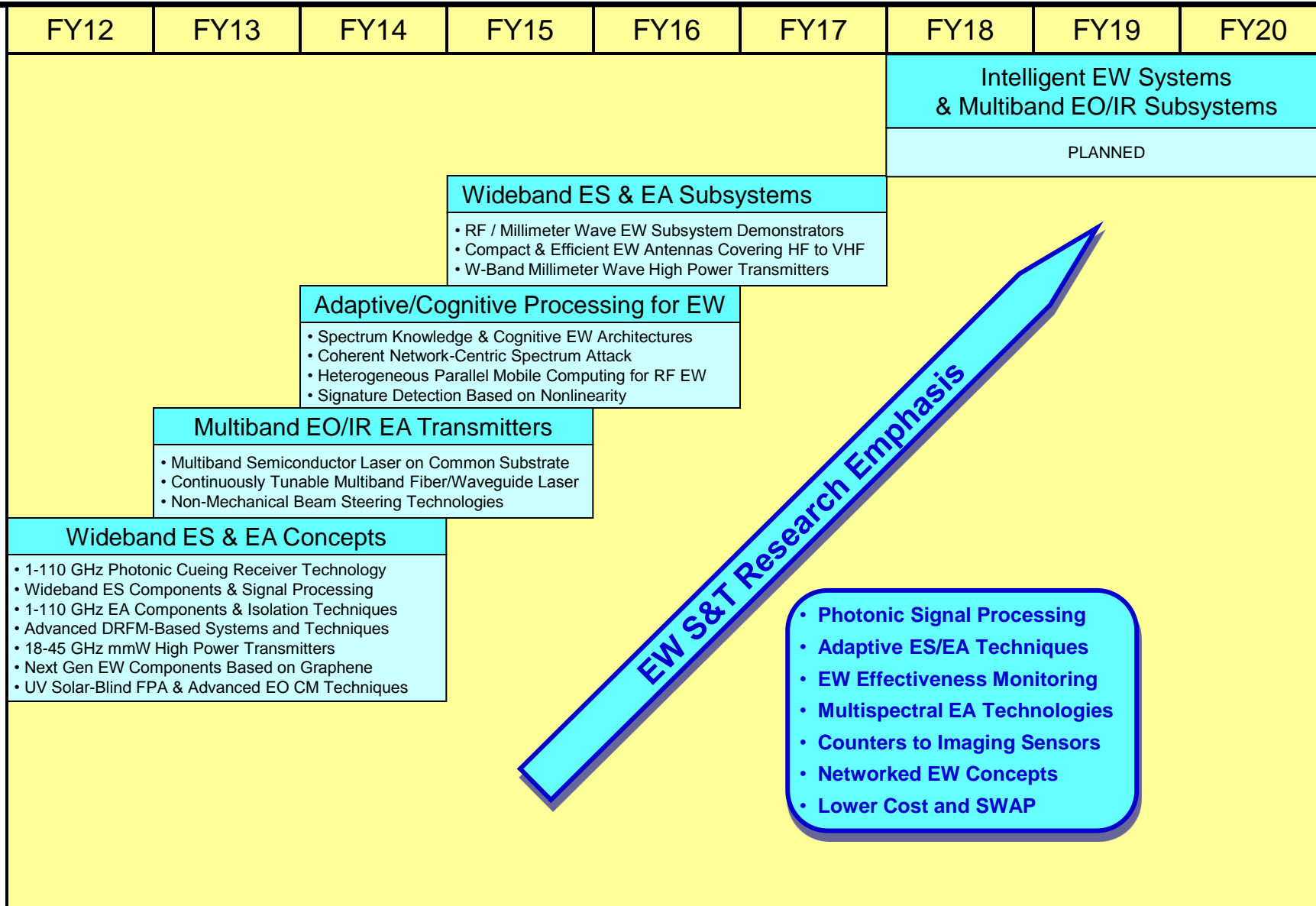
Oct - Jan

- Award Contracts
- Send Funding Documents



ONR 312 EW D&I Products

Completed, Current, and Planned





Future EW Vision



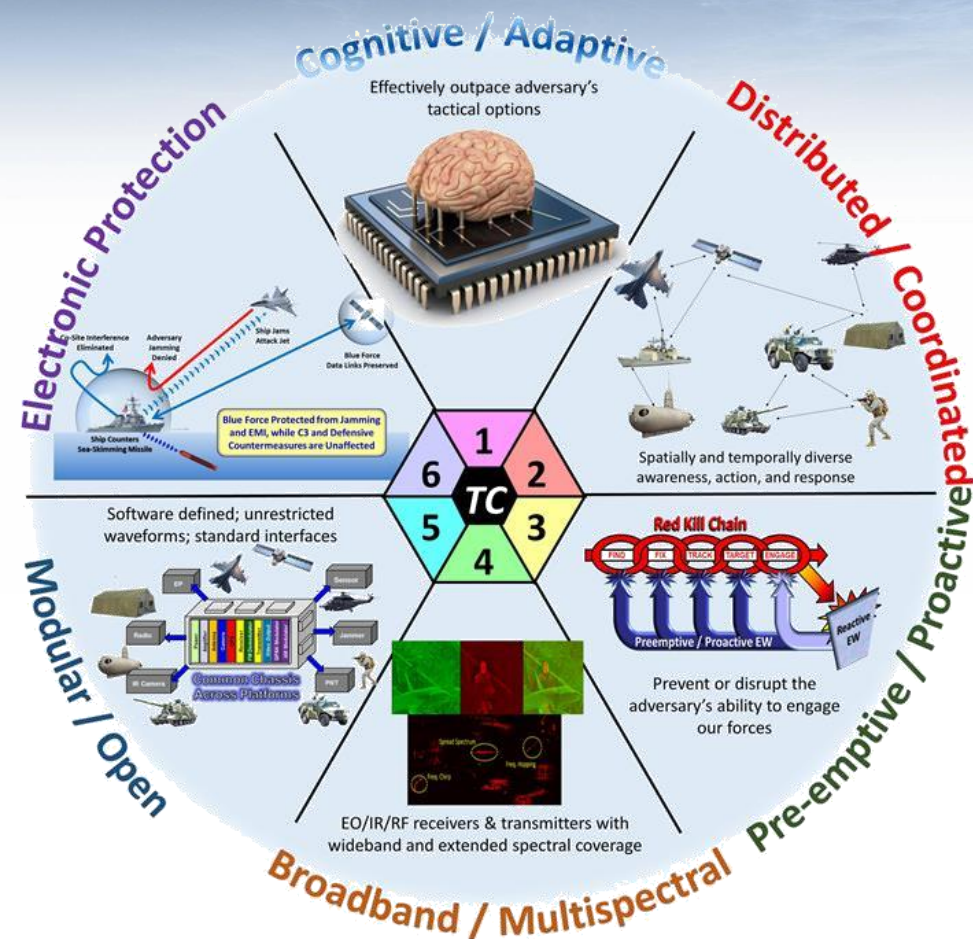
Elements of Future EW Systems	Objective Capability (What?)	Enabling Technology (How?)
Distributed	Maximize EW spatial coverage with a minimum of resources without permitting single point failures	Small, lightweight, power efficient ES / EA payloads for manned and unmanned vehicles (UAV, USV, UUV, UGV)
Coordinated	Maximize effectiveness of EW across on/off-board assets, manned / unmanned platforms, kinetic / non-kinetic resources	Multi-asset, coordinated kinetic / non-kinetic M&S; multi-platform ID / targeting / tracking / EA techniques and algorithms
Multispectral	Maximize EW spectral coverage (EO-IR-mmW-RF) and minimize spectral gaps that can be exploited by hostile forces	EO/IR/RF receiver / transmitter subsystems and components with extended spectral coverage and ultra-wide bandwidth
Adaptive	Maximize flexibility in dynamically responding to time critical, frequency agile emitters	Embedded ES / EA architectures with high-speed reactive ES processing and dynamic EA techniques generation
Robust EP	Maximize operational availability of ISRT sensor assets and preserve situational awareness in the presence of hostile EA	Dynamic / reactive / adaptive signal processing, hardened EO/IR/RF apertures and components
Increased Combat Effectiveness		



Joint EW Technology Challenges & Opportunities for EW Collaboration

The EW COI Science & Technology Roadmap

“A Cross-cutting S&T investment strategy with resulting leap-ahead capabilities involving the use of Electro-Magnetic (EM) and directed energy to control the EM Spectrum or to attack the enemy while protecting our own EM systems against interference.”



ONR's EW S&T investments synchronized across the Services



ONR Discovery & Invention

This year: N00014-17-S-B008



ONR BAA Announcement # N00014-17-S-B008



- **Posted:** *19 December 2016*
- **Agency Name:** *Office of Naval Research*
- **Research Opportunity Title:** *Electronic Warfare Technology*
- **Program Name:** *Electronic Warfare Discovery & Invention (D&I)*
- **Response Dates:**
 - **White Papers:** *21 February 2017*
 - **Full Proposals:** *5 June 2017*



ONR Discovery & Invention

This year: ONR BAA N00014-17-S-B008



ONR 312 Electronic Warfare (EW) seeks white papers for efforts that shall develop and demonstrate technologies for the next generation systems in electronic warfare. The primary emphasis of this BAA is on technologies towards

- 1. Subsystem Demonstrator for EO/IR Beam Steering at Multiple Wavelengths**
- 2. Intelligent EW Subsystem Demonstrator (SSD)**
- 3. Networked EW Concepts**
- 4. Innovative Counter Intelligence, Surveillance, and Reconnaissance (C-ISR) Concepts**
- 5. Innovative EW Concepts**



Subsystem Demonstrator for EO/IR Beam Steering at Multiple Wavelengths N00014-17-S-B008 Research Area 1



1. Subsystem Demonstrator for EO/IR Beam Steering at Multiple Wavelengths

The objective is to leverage prior investments by ONR, other Government organizations, industry, and academia in electronic and photonic technologies, techniques, components, devices and subsystems to create subsystem demonstrators (SSDs) of advanced EW capabilities in the RF, mmW and EO/IR portions of the EMS. For the purposes of this BAA, an SSD is defined as an integrated collection of components, devices and subsystems that, in conjunction with other established or developmental technologies and techniques, will demonstrate an end-to-end EW capability in Research Areas 1 & 2. Each SSD will demonstrate both the functional configuration and capability of a final EW subsystem, though not necessarily the physical configuration, packaging, or form factor. White papers and subsequent proposals will encompass not only the development of these SSDs but also a final government-witnessed demonstration in a tactically relevant real or simulated environment. In order to speed the transition of these capabilities to military (Navy, Marine Corps and Joint service) systems, Offerors are encouraged to make use of existing standards for open and modular systems that are either non-proprietary (e.g. VITA, open VPX, etc.) or to which the government has full and open rights. While each SSD description below highlights the need for reducing Size, Weight and Power (SWAP) by design, actual SWAP savings may be demonstrated through analysis rather than physical measurement. The SSD shall use technologies that are conducive to minimizing SWAP requirements for future tactical implementation on SWAP-constrained vehicles or platforms.



Subsystem Demonstrator for EO/IR Beam Steering at Multiple Wavelengths

N00014-17-S-B008 Research Area 1 (Cont'd)



The objective is to create subsystem demonstrators (SSDs) of advanced EW capability in the area of EO/IR beam steering at multiple wavelengths.

The goal of the research is for the SSD to provide the capability to non-mechanically steer multiple bands of the UV, VIS, NIR, SWIR, MWIR, and LWIR spectrum to be directed in a low divergence beam with minimal or no side lobes over an angular range covering not less than 120-degrees conical (threshold) up to a complete hemisphere (objective). Technologies that span multiple of the UV, VIS, NIR, SWIR, MWIR and LWIR spectral bands (preferably all) are desired, with particular emphasis on the inclusion of the UV, MWIR and LWIR bands. The demonstrated SSD shall operate at room temperature, and the multiple discrete laser emissions shall be combined to produce a single continuous wave (CW) multispectral beam with good beam quality ($M^2 < 3$) and output powers of not less than 10 Watts (threshold) to greater than 20 Watts (objective) in EACH spectral band. The proposed SSD's non-mechanical beam steering capability should be at least as fast (preferably faster) than current mechanical approaches and the SSD shall use technologies that are conducive to minimizing size, weight and power (SWAP) requirements for future tactical implementation on SWAP-constrained platforms. For the purposes of this BAA, the term "non-mechanical" is used to express the desire to eliminate large, heavy, and power hungry gimbals and motor-positioners along with rotating seals that often result in beam directors with reduced service lifetimes and low mean-time-between-failure (MTBF). Proposed concepts should also be compatible with installations embedded in the skin of a platform/vehicle (preferably conformal). Designs that minimize the impacts of temperature and vibration on the output power and beam quality are also desired.



Intelligent EW Subsystem Demonstrator (SSD) N00014-17-S-B008 Research Area 2



2. Intelligent EW Subsystem Demonstrator

The objective is to leverage prior investments by ONR, other Government organizations, industry, and academia in electronic and photonic technologies, techniques, components, devices and subsystems to create subsystem demonstrators (SSDs) of advanced EW capabilities in the RF, mmW and EO/IR portions of the EMS. For the purposes of this BAA, an SSD is defined as an integrated collection of components, devices and subsystems that, in conjunction with other established or developmental technologies and techniques, will demonstrate an end-to-end EW capability in Research Areas 1 & 2. Each SSD will demonstrate both the functional configuration and capability of a final EW subsystem, though not necessarily the physical configuration, packaging, or form factor. White papers and subsequent proposals will encompass not only the development of these SSDs but also a final government-witnessed demonstration in a tactically relevant real or simulated environment. In order to speed the transition of these capabilities to military (Navy, Marine Corps and Joint service) systems, Offerors are encouraged to make use of existing standards for open and modular systems that are either non-proprietary (e.g. VITA, open VPX, etc.) or to which the government has full and open rights. While each SSD description below highlights the need for reducing Size, Weight and Power (SWAP) by design, actual SWAP savings may be demonstrated through analysis rather than physical measurement. The SSD shall use technologies that are conducive to minimizing SWAP requirements for future tactical implementation on SWAP-constrained vehicles or platforms.



Intelligent EW Subsystem Demonstrator



N00014-17-S-B008 Research Area 2 (Cont'd)

The objective is to create a subsystem demonstrator (SSD) that can outperform traditional EW systems with static emitter databases and pre-programmed countermeasures. Radio Frequency (RF) systems are becoming increasingly more agile in waveforms, bandwidth, functionality, and EA/EP techniques. Traditional static emitter EW databases and pre-programmed countermeasures could be inadequate against future threat systems employing such agility. The objective of this SSD is to develop the next generation of EW capability for surface ships that (1) autonomously adapts its EW strategies without using static rules, and (2) outpaces red force tactical options by operating within red decision making timelines. The proposed technology should have the ability to dynamically a) identify and track emitters, b) maintain multiple hypotheses with likelihood estimates on aspects of emitter functional characteristics that are uncertain, c) generate and maintain a list of proposed countermeasures for each threat emitter, d) assess countermeasure effectiveness, and e) refine EA technique. The SSD should be able to demonstrate significantly improved performance in one or all of a) -e) over state-of-the-art methods. This intelligent EW SSD needs to perform fast enough to outpace red force tactical options by operating within red decision making timelines. At a minimum, this SSD should counter radar in an environment that contains common RF systems such as communications, jammers, and precision timing and navigation systems for both blue and red forces. This SSD may restrict the hypothetical operational scenario to blue EW assets on a single organic surface platform with or without multiple antennas (or arrays), or consider distributed blue scenarios in which blue EW assets on separate platforms are networked together for collaborative operations. In either case, operations would be optimized to maximize platform and/or weapon survivability and comply with commander's intent/mission objectives.



Subsystem Demonstrators (SSD)



A categorized listing of prior and current ONR 31 EW technology efforts, along with contact information for the performers, can be found in Attachment 1 of this BAA.

- Other technology efforts funded by ONR and other government sponsors (e.g. DARPA, AFRL, ARL, DoE, NSA, NSF, ONI, etc.) can also be leveraged with proper acknowledgment.

Attachment 1
Solicitation Number N00014-17-S-B008 for Electronic Warfare Technology

Listing of Prior and Current ONR 31 EW Technology Efforts

APERTURES	FY Start	FY End	Organization	PI	EMAIL	PHONE
RF Antennas						
Antennas from VHF to THz	FY08	FY10	Univ Colorado	Prof. Dejan Filipovic	dfilip@colorado.edu	303-735-6319
Integrated mmW OF Subsystems & Dual-Polarized Antennas	FY11	FY13	Univ Colorado	Prof. Dejan Filipovic	dfilip@colorado.edu	303-735-6319
Submarine Buoyant Cable Media-dielectric Antennas for EW	FY11	FY13	MUWIC	Dr. David Torn	david.torn@navy.mil	401-852-5481
1-110 GHz Two Aperture ESA for Electronic Attack	FY12	FY14	Harris Corp	Dr. Sean O'Neil	sean.o'neil@harris.com	321-726-2095
Multifunctional Array and Frequency Independent Antennas (MFAIA)	FY10	FY13	Univ Colorado	Prof. Dejan Filipovic	dfilip@colorado.edu	303-735-6319
Conformal Dielectric Feedarray Systems	FY10	FY13	Fred RF	Mr. Steve Dawson	sdawson@fredrf.com	303-449-5211 x228
Electrically Small Antennas for Super-Resolving OF and H-Power EA at HF/NHF	FY15	FY18	Univ Wisconsin	Prof. Nader Behdad	nbehdad@engr.wisc.edu	608-262-8004
Aperture Isolation	FY Start	FY End	Organization	PI	EMAIL	PHONE
Isolation Improves Between Multiple Aperture EASs	FY12	FY14	MIT-LL	Dr. Bradley Perry	bperry@ll.mit.edu	781-681-0861
Simultaneous Transmit and Receive (STAR) for Look-Through Electronic Attack	FY11	FY15	MIT-LL	Dr. Bradley Perry	bperry@ll.mit.edu	781-681-0861
CIA - Circular in Aperture	FY15	FY18	Univ Colorado	Prof. Dejan Filipovic	dfilip@colorado.edu	303-735-6319
Modular, Adaptive, and Multi-Function RF Front-end	FY12	FY15	MITRE	Mr. Marcus Glenn	glenn@mitre.org	781-863-5803
Signal Processing Electronic Attack RFIC (SPEAR)	FY15	FY18	NRL 5730UCB	Mr. Joel Goodman	jgo@nrlssc.navy.mil	202-404-2684
EO/IR Beam Steering	FY Start	FY End	Organization	PI	EMAIL	PHONE
Multiplexed Optical Phased Array Beam Steering	FY13	FY15	Univ. Calif Davis	Dr. Ben Yoo	yoo@ece.ucdavis.edu	530-752-7063
Multi-Band Optical Phased Array Beam Former	FY13	FY16	HRL Laboratories	Dr. Kevin Geary	kgear@hrl.com	310-317-5271
Liquid Crystal for Non-Mechanical Beam Steering	FY13	FY15	NRL 6930	Dr. Christopher Spillmann	christopher.spillmann@nrl.navy.mil	202-767-0477
Low-Absorption Liquid Crystals for Infrared Beam Steering	FY13	FY15	Univ Central Florida	Prof. Shin-Tsun Wu	twu@mail.ucf.edu	407-823-4763
Refractive Non-Mechanical Beam Steering in the Midwave and Longwave Infrared	FY16	FY18	NRL 6930	Dr. Christopher Spillmann	christopher.spillmann@nrl.navy.mil	202-767-0477
ES SYSTEMS						
Wideband RF Receivers	FY Start	FY End	Organization	PI	EMAIL	PHONE
Curing Receiver for Faster EA Response Management	FY08	FY10	Naval Postgrad School	Prof. Philip Pace	ppace@nps.edu	813-659-3236
Miniature 2-70 GHz Integrated Optical Channelizer	FY08	FY11	Northrop Grumman	Dr. Aleks Goutzoules	agoutzoules@ngc.com	410-765-7076
Wideband Photonic Cuing Receiver for ES	FY12	FY14	JHUAPL	Dr. Thomas Clark	thomas.clark@jhuapl.edu	240-228-5185
1-110 GHz Photonic Cuing Receiver	FY12	FY15	Northrop Grumman	Dr. Aleks Goutzoules	agoutzoules@ngc.com	410-765-7076
Extreme Wideband Spatial Spectral Holographic Signal Processor [ONR SBIR Ph 2.5]	FY13	FY14	SC2 Corporation	Dr. Kris Markel	markel@sc2corp.com	406-622-0334
Full Spectrum Steering ES Receiver with Instantaneous OF	FY15	FY18	BAES/SHRL/UCB/ML	Mr. Steve Hedges	shedges@baesystems.com	863-685-2315
Wideband, High-Dynamic Range, Software Programmable Receiver & Vector Spectrum/Signal Analyzer in a USB Dongle Form Factor	FY10	FY13	Univ Southern Calif	Prof. Hossein Hassani	hassani@usc.edu	213-740-3596
High Dynamic Range Receiver	FY11	FY13	HRL Laboratories	Mr. Ara Kurudighian	ara@hrl.com	310-317-5404
ES Components	FY Start	FY End	Organization	PI	EMAIL	PHONE
Wideband Gait EW Support Receiver Components	FY12	FY15	HRL Laboratories	Mr. Ara Kurudighian	ara@hrl.com	310-317-5404
Miniature Broadband Tunable Filters for EW Receivers	FY12	FY15	BAE/NRL 6951	Mr. Thomas Johnson Dr. Andrew Gueyde	thomas.johnson@baesystems.com andrew.gueyde@nrl.navy.mil	863-685-6149 202-404-4606
Next Gen EW Components Based on Graphene	FY12	FY15	Penn St./NSWC Crane	Dr. Joshua Robinson Dr. Charles Page	jrobinson@psu.edu chuck.page@navy.mil	814-867-1560 812-454-2362
EO/IR Sensing	FY Start	FY End	Organization	PI	EMAIL	PHONE
Rapid Threat Detection & ID using Multi-band, High-Res LADAR	FY11	FY14	Bridge Photonics	Dr. Peter Ross	ross@bridgephotonics.com	406-566-2774
High Performance Solar-Bind FPAs for Next Gen MWS	FY12	FY15	MP Technologies	Dr. Ryan McEntok	rmcintosh@mp-tech.com	361-487-4003
Extremely Sensitive Solid State UV Photodetector	FY12	FY14	Univ Nebraska	Prof. Jinsong Huang	jhuang2@unl.edu	402-472-2640

ES Processing	FY Start	FY End	Organization	PI	EMAIL	PHONE
Non-Traditional Signal Exploitation using Photonic Processing	FY08	FY11	Montana State Univ	Dr. Randall Babitt	babitt@physics.montana.edu	406-924-8156
Real-Time EA Effectiveness Monitoring	FY09	FY12	NRL 5760	Dr. Josh Baum	josh.baum@nrl.navy.mil	202-404-3803
WB Low Power Cognitive Signal Processing IC	FY12	FY15	HRL Laboratories	Dr. Peter Pabre	ppabre@hrl.com	323-317-5919
Wideband RF Processing - Net-Positive Parametric Mixers	FY12	FY15	UCSD/SPAWAR	Dr. Sloan Radio	sradio@ucsd.edu	858-534-4344 818-553-1614
Spatial Spectral Holographic Rainbow Spectrometer	FY10	FY14	Montana State Univ	Dr. Randall Babitt	babitt@physics.montana.edu	406-924-8156
CS-based Extremely Wideband Spectral Awareness (EWSA)	FY11	FY13	Grid Systems	Mr. James Coffey Jr.	jcoffey@gridsystems.com	510-291-2900 x103
Broadband Electronic Warfare Effectiveness in Real-time (BEWEAR)	FY16	FY18	NRL 5720	Dr. Crystal Acosta Andre Adnan Capt Don Gruber	crystal.acosta@nrl.navy.mil andre.adnan@nrl.navy.mil donald.gruber@us.af.mil	202-404-3313 443-661-1402 807-713-4020
Passive Detection Capability for Existing Operation Systems	FY16	FY17	SSC/Pacific SB 140	Nick Johnson	nickolas.johnson@navy.mil	619-553-2119
ES Techniques	FY Start	FY End	Organization	PI	EMAIL	PHONE
Digital Directional Correlator	FY08	FY10	Northrop Grumman	Dr. Maury Marks	maury.marks@ngc.com	410-765-2652
Direction Finding of LP Emissions	FY09	FY12	NRL 5722	Mr. Joseph Frankovich	joseph.frankovich@nrl.navy.mil	202-404-7632
Cooperative Minuties Distributed Sensors for EW	FY11	FY14	Univ Southern Calif	Prof. Hossein Hassani	hassani@usc.edu	213-740-3596
ES/SEW: SEI & Geo-Location in Complex EM Environment	FY11	FY13	Michigan Tech	Dr. David Johnson	djohnson@mtu.edu	734-975-5777 x140
ES/ESST: pseudo-Coupler-Enabled Synthesis Imaging	FY11	FY14	Ladco (formerly SAC)	Dr. Jim Hendrix	jim.hendrix@ladco.com	703-676-1968
Electronic Attack Adaptive Detector Subcar	FY11	FY14	MIT-LL	Dr. W. Gregory Lyons	lyons@ll.mit.edu	781-681-4705
Signature Detection Based on Nonlinearity	FY14	FY17	NRL 6962	Dr. Thomas Carroll	thomas.carroll@nrl.navy.mil	202-767-4242
Multi-Platform Passive Localization of RF Emissions	FY16	FY18	NRL 5720	Dr. Ted Roberts	tedroberts@nrl.navy.mil	202-767-3139
Cognitive Architecture for Cooperative Electronic Warfare	FY14	FY16	NRL 5722	Dr. Eric Juth	eric.juth@nrl.navy.mil	202-404-7638
Cognitive Radio Network Identification, Association, and Attack	FY14	FY16	NRL 5734	Dr. Crystal Acosta	crystal.acosta@nrl.navy.mil	202-404-3313
Heterogeneous Parallel Mobile Computing for Cognitive EW	FY14	FY16	Virginia Tech	Dr. T. Charles Clancy	tcclancy@vt.edu	571-858-3550
Spectrum Knowledge Framework	FY14	FY16	JHUAPL	Mr. Robert Normandy	robert.normandy@jhuapl.edu	240-228-5010
Communicating Spectrum Knowledge Through A Signal Descriptor Language	FY14	FY16	NRL 5772	Dr. David Chizhka	david.chizhka@nrl.navy.mil	202-404-6226
EA Processing	FY Start	FY End	Organization	PI	EMAIL	PHONE
Concurrent Multi-Spectral RF Carrier Generator	FY09	FY12	Univ Southern Calif	Prof. Hossein Hassani	hassani@usc.edu	213-740-3596
Bi-Baseband Monolithic DRFM	FY12	FY15	Univ Southern Calif	Prof. Hossein Hassani	hassani@usc.edu	213-740-3596
Wideband Millimeter Signal Estimator (WBSE) DRFM	FY12	FY14	NRL 5732	Mr. T. Christopher Moss	tmoss@nrl.navy.mil	202-767-3505
Next-Generation EIR Processor	FY12	FY13	MIT-LL	Dr. W. Gregory Lyons	lyons@ll.mit.edu	781-681-4705
EA Techniques	FY Start	FY End	Organization	PI	EMAIL	PHONE
Integrated Coherent/Orthogonal EA Effectiveness	FY08	FY12	NRL 5743	Mr. Anwar Khan	anwar.khan@nrl.navy.mil	202-404-3733
Passive Coherent Location Denial	FY11	FY13	NRL 5730	Mr. Christian Hoshni	christian.hoshni@nrl.navy.mil	202-767-3025
Countering LTE and 5G/4G Enhanced LTE Communications	FY10	FY12	Shared Spectrum Co.	Dr. Mark Mohrney	mark.mohrney@sharedspectrum.com	703-462-6943
Countering Advanced Threats in Complex RF Environments with Cognitive Techniques	FY13	FY15	Edco Ridge	Mr. John Carlson	johncarlson@edcoridge.com	703-343-1467
Coherent Network-Centric Spectrum Attack	FY14	FY17	NAWC/P5 Mugu	Mr. Mike Garcia	michael.garcia@navy.mil	808-869-4951
EA Swarming Technologies for Counter Anti-Aircraft, Area Denial Applications	FY16	FY18	NRL 5708	Dr. Jeff Hayer	jeff.hayer@nrl.navy.mil	202-404-2538
EA SYSTEMS						
RF/mmW Transmitters	FY Start	FY End	Organization	PI	EMAIL	PHONE
Compact 25-30kW ERP Driven Tx w/ Continuous 18-45 GHz Freq Coverage	FY12	FY14	NRL 6909	Dr. Baruch Levush	baruch.levush@nrl.navy.mil	202-767-5693
A Digital Transmitter on Chip	FY12	FY14	NRL/MT-LL	Mr. Joel Goodman	joel.goodman@nrl.navy.mil	202-404-2964



Subsystem Demonstrators (Cont'd)



A categorized listing of prior and current ONR 31 EW technology efforts, along with contact information for the performers, can be found in Attachment 1 of this BAA.

- Other technology efforts funded by ONR and other government sponsors (e.g. DARPA, AFRL, ARL, DoE, NSA, NSF, ONI, etc.) can also be leveraged with proper acknowledgment.

Monolithic Software Programmable Wideband Transmitter and Multi-Input Multi-Output Transceiver	FY12	FY15	Univ Southern Calif	Prof. Hossain Hashemi	hhashemi@uoc.edu	213-740-3586
mmW Scalable Prototype System (MPS) Demonstrator	FY15	FY15	NRL 855	Dr. John Pasour	john.pasour@nrl.navy.mil	202-404-4875
High-Power Electronic Attack Transmitter	FY15	FY19	NRL Laboratory	Mr. Ara Kurdughlian	ara@nrl.com	330-317-5404
15-45 GHz Decay for Defense against mmW Guided Anti-Ship Missiles	FY15	FY17	NRL 5713	Dr. Gary Roan	gary.roan@nrl.navy.mil	202-767-6191
EA Components	FY Start	FY End	Organization	PI	EMAIL	PHONE
PlayStation Time Delay Unit	FY12	FY15	Hamtronics	Mr. Steve Houtner	shoutner@hamtronics.com	800-341-2333 x127
Enabling Technology for High Power mmW on Small Platforms	FY12	FY15	Univ of Colorado	Prof. Dejan Filipovic	dejan@colorado.edu	303-735-6319
Multiplexer and Tunable Filters for Channelized Transmitter Architecture	FY10	FY13	NRL 851	Dr. Andrew Guyette	andrew.guyette@nrl.navy.mil	202-404-4606
mmW EIR System Subsystem Demonstration	FY15	FY17	CNA	Dr. Chuck Heider	heider@cna.org	703-624-2867
Multi-Configurable Filters for Wideband Receivers and Transmitters	FY11	FY15	NRL 851	Dr. Andrew Guyette	andrew.guyette@nrl.navy.mil	202-404-4606
Common Dual-Band Power Module	FY15	FY16	NRL 5713	Dr. Gary Roan	gary.roan@nrl.navy.mil	202-767-6191
EO/IR Transmitters	FY Start	FY End	Organization	PI	EMAIL	PHONE
Sub-Wavelength Laser with Broad Spectral Coverage	FY15	FY15	Coherent Solutions	Dr. Timothy Day	tday@coherentsolutions.com	955-591-1010
High-Power LWIR QCL Lasers for Day/Night SICM	FY15	FY15	A2Tech	Dr. Marlene Traversi	marlene.traversi@a2tech.com	626-955-1000
High-Power Multispectral Laser on Hybrid Silicon Chip	FY13	FY15	NRL 9613	Dr. Jerry Meyer	jerry.meyer@nrl.navy.mil	202-767-3276
High-Brightness Monolithic Multispectral QCL Lasers	FY13	FY16	Tera Diode	Dr. Robin Huang	rhuang@teradiode.com	978-868-1560 x102
Novel Multispectral Fiber Laser Architecture	FY13	FY16	Q-Peak	Dr. Kevin Wall	kwall@qpeak.com	781-275-9035 x601
Frequency Agile Fiber Laser w/ GHz Frequency Conversion	FY13	FY15	NRL 9624	Dr. Steven Bowman	steven.bowman@nrl.navy.mil	202-767-9419
Multi-Spectral High-Power MWIR Laser on a Hybrid Silicon Chip	FY16	FY18	NRL 9613	Dr. Jerry Meyer	jerry.meyer@nrl.navy.mil	202-767-3276
Optical Chipset for Array Processing	FY15	FY17	NRL 5550	Dr. Keith Williams	keith.williams@nrl.navy.mil	202-767-6360
EO Broad Area Superlattice for Ultra-High Power, High-Brightness CW MWIR Emitters	FY16	FY18	Univ of Central Florida	Prof. Anthony LaRuff	Anthony.LaRuff@ucf.edu	407-623-0999



ONR Discovery & Invention

N00014-17-S-B008 Research Area 3



3. Networked EW Concepts

Networking of multiple EW transmitters and receivers offers tactical advantages that are only yet partially recognized. Full exploitation and control of the EMS would require every EW asset to “know” what every other EW asset in the network is receiving and transmitting, coherently and instantly, and react with a coordinated response that is also coherent and instantaneous. Clearly, bandwidth, latency, and finite processing resources make this theoretical ideal impossible to approach. The objective of this area is to explore, identify, and define the parameters and techniques required to provide a fundamental networked EW capability. This objective area seeks innovation that advances the capability, reaction, and coordination of networked EW assets rather than management of existing assets or creation of a new communications system. Innovation is expected in which specific capabilities of networked EW substantially exceed that of the individual assets acting alone. Proposals for general EW networking “frameworks” in which the benefits are ambiguous or left to future work are not acceptable.



ONR Discovery & Invention

N00014-17-S-B008 Research Area 4



4. Innovative Counter-Intelligence, Surveillance, and Reconnaissance (C-ISR) Concepts

The objective of this area is to explore truly innovative EW concepts which can counter emerging EO/IR imaging sensor threats. The traditional approach to defeating such sensors is to employ high optical/infrared power countermeasures that saturate or damage the imaging sensor. Proposals are being sought for non-traditional solutions to the problem of deceiving and/or denying imaging sensors without resort to such “brute force” techniques. Proposals responding to this solicitation should focus on innovative solutions involving emerging, cutting-edge technologies.



ONR Discovery & Invention

N00014-17-S-B008 Research Area 5



5. Innovative EW Concepts

The objective is to **explore truly innovative concepts in the EW** areas of ES, EA, or EP which could fundamentally change the way naval (Navy and Marine Corps) forces conduct EW operations.

This sub-section should only be cited by proposals that do not fall within any of the other sub-sections of this Research Opportunity Description.

Examples of what I would consider “Innovative Concepts” (circa 1966)



Phaser™ Technology



Shield Technology



Romulan™ Cloaking Device

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ONR Discovery & Invention

N00014-17-S-B008 Award Info



- **Total funding under this BAA is anticipated to be \$9M per year, or \$27M over three years.**
- **The period of performance for projects may be from 12 to 36 months.**
- **The estimated start date of selected projects is subject to date of final award and availability of fiscal year (FY) funds.**
 - **The Government's goal is to award with a start date of 08 January 2018**



ONR Discovery & Invention

N00014-17-S-B008 Award Info



- At the same time this BAA was posted, the Government sent out a parallel solicitation to government labs and other parties that are barred from proposing to the BAA. There are no fixed percentages or set-asides for the two solicitations and ALL the White Papers/Oral Briefs/Proposals are evaluated together to determine which should be funded using evaluation criteria specified in the BAA.
- The award(s) will be made for the full performance period requested. Options will not be utilized.



ONR Discovery & Invention N00014-17-S-B008 Eligibility



- All responsible sources from academia and industry may submit proposals under this BAA.
- University Affiliated Research Centers (UARC) are eligible to submit proposals under this BAA unless precluded from doing so by their Department of Defense UARC contracts.
- There will be no set asides for Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs).
- Some topics cover export controlled technologies. Research in these areas is limited to “U.S. persons” as defined in the International Traffic in Arms Regulations (ITAR) - 22 CFR § 1201.1 et seq.



ONR Discovery & Invention N00014-17-S-B008 Eligibility



- Navy laboratories and warfare centers, as well as other Department of Defense and civilian agency laboratories, and Federally Funded Research & Development Centers (FFRDCs), including Department of Energy National Laboratories, are **not eligible to receive awards under this BAA** and should not directly submit either white papers or full proposals in response to this BAA.
- **NOTE: Responses from these organizations are being solicited separately, using the same guidance regarding research areas of interest, white paper format, deadlines, and evaluation criteria.**



ONR Discovery & Invention

N00014-17-S-B008 Eligibility



- **Bottom line**: All civilian, industry, government, and military organizations are encouraged to submit white paper responses to the five ONR EW research areas as solicited.
 - **Industry: N00014-17-S-B008**
 - **Government and Military: N00014-17-S-B008-G / “Solicitation of White Papers for 2018 Office of Naval Research Electronic Warfare Discovery and Invention Program”**
- **Once a proposed effort has been chosen for funding, ONR will proceed as discussed in the underlying solicitation (BAA) or using internal approved processes (MIPR).**



ONR Discovery & Invention

N00014-17-S-B008 White Papers



- The due date for white papers is no later than 3:00 PM (Local Time, Washington, D.C.) on Tuesday, 21 February 2017. **White papers received after the published due date and time are not eligible to participate in the remaining Full Proposal submission process and are not eligible for Fiscal Year (FY) 2018 funding.** Each white paper should state that it is submitted in response to this BAA and cite the particular subsection of the Research Opportunity Description that the white paper is primarily addressing.



ONR Discovery & Invention

N00014-17-S-B008 White Papers



- This year White Papers shall be submitted as an Adobe PDF or Word 2010 file via a secure (encrypted) file transfer protocol (FTP) site. Procedures are as follows:
 - Register for a user account to the FTP site prior to submitting White Papers by sending an email to ONR.NCR.312.list.EW-Group@navy.mil.
 - The subject line of the email must state “N00014-17-S-B008 FTP User Registration”.
 - The body of the email must include the primary point of contact’s name, any additional points of contacts (names), title(s), organization, department(s) or company division(s), telephone and fax numbers, and email address(es).
 - Registrants will receive a reply email from the FTP Site Administrator that includes the user name, a temporary password, and the internet protocol (IP) address of the FTP site along with uploading instructions.
 - Potential Offerors will be able to start registering for user accounts on Monday, 6 February 2017, and will be issued within two business days of the received email request.
 - Registration requests for user accounts that are submitted less than 96 hours before the White Paper submission deadline may not be issued.
 - All user accounts will be disabled on Tuesday, 21 February 2017 at 3:00 PM (Local Time, Washington, D.C.) and further file uploads will not be permitted.

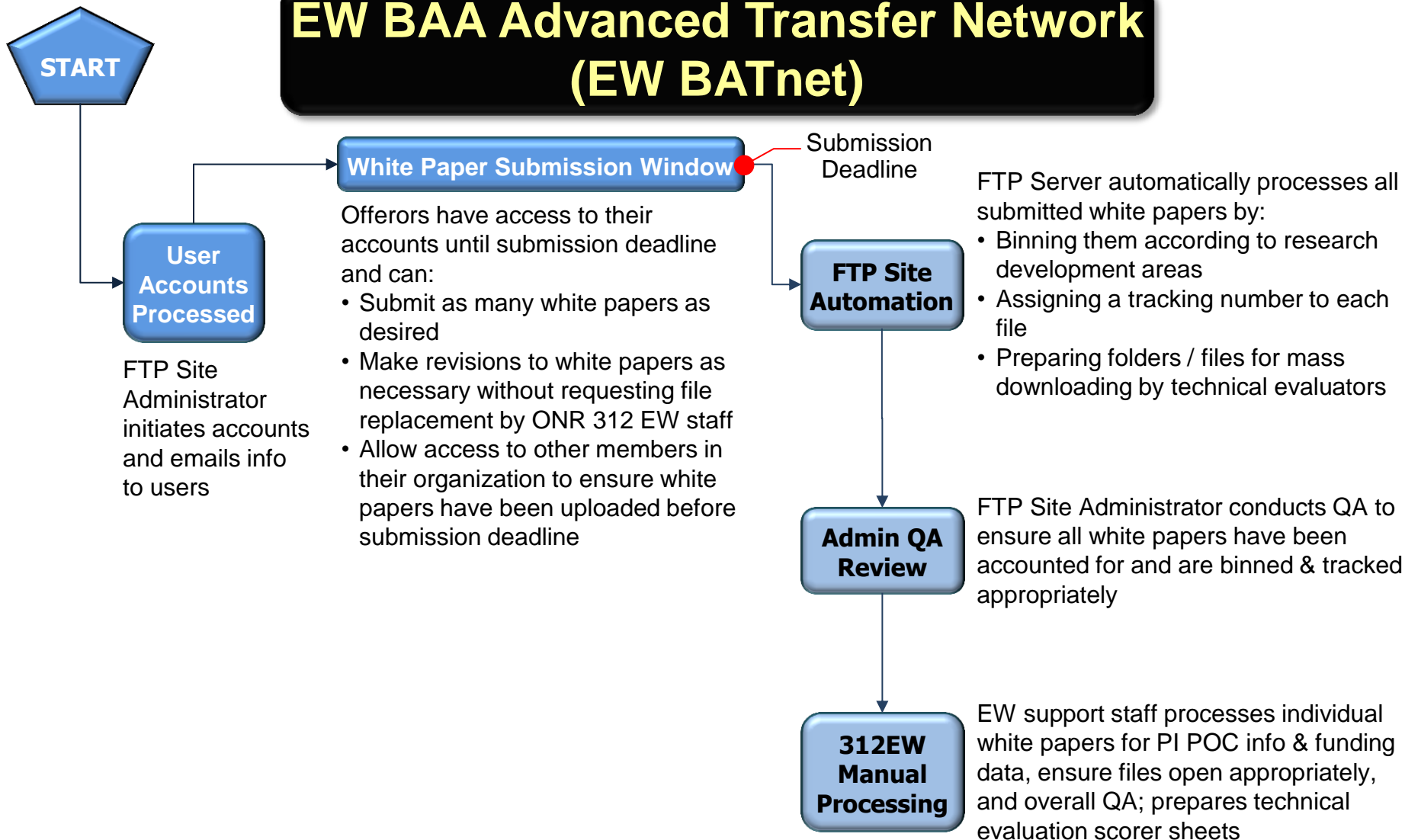


ONR Discovery & Invention

N00014-17-S-B008 White Papers



EW BAA Advanced Transfer Network (EW BATnet)





ONR Discovery & Invention

N00014-17-S-B008 White Papers



White Paper Format

- **Paper Size – 8.5 x 11 inch paper**
- **Margins – 1” inch**
- **Spacing – single spaced**
- **Font – Times New Roman, 12 point**
- **Number of Pages – No more than six (6) pages (excluding cover page, resumes, bibliographies, table of contents and Attachment 2). White Papers exceeding the page limit may not be evaluated.**
- **Format – One (1) electronic copy in Adobe PDF or Microsoft Word 2010 compatible file formats uploaded to the secure (encrypted) FTP site.**



ONR Discovery & Invention

N00014-17-S-B008 White Papers



White Paper Content

- **Cover Page:** The Cover Page shall be labeled “WHITE PAPER” and shall include the BAA Number N00014-17-S-B008, proposed title, technical points of contact, telephone number, facsimile number, and E-mail address.
- **Technical Concept:** A description of the technology innovation and technical risk areas.
- **Operational Naval Concept (where applicable):** A description of the project objectives, the concept of operation for the new capabilities to be delivered, and the expected operational performance improvements.
- **Operational Utility Assessment Plan (where applicable):** A plan for demonstrating and evaluating the operational effectiveness of the Offeror’s proposed products or processes in field experiments and/or tests in a simulated environment.
- **Programmatic Section:** A project schedule, a summary of planned milestones and a funding plan showing requested funding per government fiscal year, as well as the total funding request.
- **Leveraged efforts (Areas 1 & 2 only):** A listing of leveraged ONR- and Government-funded efforts, using the template provided (Attachment 2).
- **Resumes:** A single page (each) summary resume (including previous relevant experience and pertinent publications) for Project Manager and/or Principal Investigator.



ONR Discovery & Invention

ONR BAA N00014-17-S-B008 White Papers



White Paper Content

- **Leveraged Efforts (Areas 1 & 2 only)**
 - **ONR BAA N00014-17-S-B008 Attachment 2 (below) provides a template that should be followed in submitting a listing of current and/or prior government-funded S&T efforts that will be leveraged by the Offeror.**

Attachment 2
Solicitation Number N00014-17-S-B008
Electronic Warfare Technology

Title of Proposed Effort:
Lead Organization:
Principal Investigator:

Listing of Leveraged Government-Funded S&T Efforts (Must be Completed for Area 1 and Area 2 Submissions)

#	Title/Description of Prior S&T Effort	Performing Organization	Technical POC (Name, Email, Phone)	Government POC (Name, Email, Phone)	Funding Organization & Contract / Grant / Funding Document #	Function Enabled in Proposed Effort	Percentage Contribution to Proposed Effort
1	Example: Investigation of Gravitic Anomalies on Wormhole Generation	Vulcan Institute of Science	Mr. Spock spock@vulcaninstitute.edu 999-555-2230	CAPT James T. Kirk james.kirk@starfleet.mil 999-555-2233	Office of Starfleet Research Grant S00016-67-1-2245	Generation of non-RF comms channels to permit jam-proof networks for transmitting EW message sets.	10% of proposed budget will mature this technology for demonstration.
2	Example: Wideband Translators Fabricated from Radium Nitride	Scott Engineering Corporation	Montgomery Scott scotty@scottengineering.com 111-555-2222	CAPT James T. Kirk james.kirk@starfleet.mil 999-555-2233	Office of Starfleet Research Contract S00016-67-C-1701	Wideband translators will be used for generating delta ray emissions for jamming photon torpedoes.	20% of proposed budget will be used for a limited foundry run of wideband translators for demonstration unit.
3	Example: Detection of Warp Field Emissions Using Polarization of Spatially Inverted Tetrons	Starfleet Research Laboratory	Pavel Chekov pavel.chekov@srl.starfleet.mil 555-555-2245	CAPT James T. Kirk james.kirk@starfleet.mil 999-555-2233	Office of Starfleet Research Funding Document S00016-67-WX-65658	Enables precision location, identification, tracking, and targeting of cloaked starships.	5% of proposed budget will implement this signal processing technique in MatLab for evaluation and testing.
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ONR Discovery & Invention N00014-17-S-B008 Schedule



The following schedule has been established to facilitate the submission of white papers and their follow-on review and possible selection for FY 2018 funding.

21 Feb 2017	White paper responses to EW research areas due to ONR
15 Mar 2017*	ONR notify selected parties to prepare briefing for EW Review
12 Apr 2017*	Oral presentations at the ONR EW S&T Review
19 Apr 2017*	ONR notify selected parties to prepare/submit full proposal
05 Jun 2017	Full technical/cost proposal due to ONR
26 Jun 2017**	ONR notify selected parties of intent to fund efforts
FY18	ONR issues awards

*** *These dates are estimates***

**** *The Government's goal is within 2 weeks of Full Proposal due date.***



ONR Discovery & Invention

ONR BAA N00014-17-S-B008

Evaluation Criteria



Evaluations will be conducted using the following evaluation criteria:

1. Technical Factor: Overall scientific and technical merits of the proposal and responsiveness to the topic (i.e., the degree of innovation, soundness of technical concept, Offeror's awareness of the state of the art and understanding of the scope of the problem, and anticipated scientific impact within the field). This factor also includes:
 - a) The Offeror's capabilities, related experience, facilities, techniques or unique combinations of these which are integral factors for achieving the proposal objectives and
 - b) The credibility of the proposed Program structure, milestones, and execution plan for measuring and achieving goals and reducing technical risk
2. Technical Factor: Potential Naval/Military relevance and contribution to the ONR and Department of Navy in the area of Electronic Warfare operations (e.g., technology addresses a military critical need, military program or initiative, potential technology transition effort identified, and/or part of a joint service technology effort).



ONR Discovery & Invention

ONR BAA N00014-17-S-B008

Evaluation Criteria (Cont'd)



3. Technical Factor: Number and quality of leveraged efforts supporting proposed technology through the use of partnerships or teaming arrangements between multiple performers (industry, academic, government) (Areas 1, and 2 ONLY). This includes the degree to which prior/current ONR, Government, industry and/or academia-funded electronic and photonic technology, technique, component, device and/or subsystem research efforts are leveraged for the proposed EW demonstrator and the criticality of the prior efforts in enabling the proposed EW capability demonstration. Multiple funded efforts that advance the maturity of the same fundamental technology will be counted as ONE research effort).

4. Cost Factor: Availability of Funds

For research areas 1 and 2: Overall, Technical Factors 1 and 2 and Cost Factor 4 are equally important. Technical Factors 1 and 2 are significantly more important than Technical Factor 3.

For research areas 3, 4, and 5: Overall, Technical Factors 1 and 2 and Cost Factor 4 are equally important. Technical Factor 3 does not apply to research areas 3, 4, and 5.



ONR Discovery & Invention

N00014-17-S-B008 Deliverables



The following is a sample of reporting deliverables that are anticipated to be necessary. Deliverables are normally in contractor format. Specific deliverables should be proposed by each Offeror:

- **Technical and Financial Progress Reports**
- **Presentation Material(s)**
- **Final Report**
- **In addition efforts may require:**
 - **Detailed Technical Data**
 - **Other Documentation or Reports**
- **Research performed under contracts may also include the delivery of software, prototypes, and other hardware deliverables.**



ONR Discovery & Invention

N00014-17-S-B008 Facilities / GFE



- **Government research facilities and operational military units** are available and should be considered as potential government-furnished equipment/facilities. These facilities and resources are of high value and some are in constant demand by multiple programs. It is unlikely that all facilities would be used for any one specific program. The **use of these facilities and resources will be negotiated as the program unfolds. Offerors submitting proposals for contracts should indicate in the Technical Proposal Template, Section II, Blocks 8 and 9, which of these facilities are critical for the project's success.** Offerors submitting proposals for grants should address the need for government-furnished facilities in their technical proposal.
- **Proposals that are contingent upon ONR providing government furnished equipment, instrumentation, test facilities, or threat hardware and information for exploitation may not be accepted depending upon the availability of required resources.**



ONR Discovery & Invention

N00014-17-S-B008 Classification



- All white papers and proposals are expected to be unclassified. However, **classified white papers and proposals are permitted.**
- In order to facilitate intra-program collaboration and technology transfer, the **Government will attempt to enable awardees to work at the unclassified level to the maximum extent possible.**
- If awardees use unclassified data in their deliveries and demonstrations regarding a potentially classified project, they should use methods and conventions consistent with those used in classified environments. Such conventions will permit the various subsystems and the final system to be more adaptable in accommodating classified data in the transition system.



ONR Discovery & Invention

N00014-17-S-B008 Final Comments



- **ONR 312 EW will not entertain requests for individual meetings with industry representatives to discuss potential white paper submissions**
 - **No pre-selection of ideas or concepts**
 - **If in doubt, write the white paper and submit it**
- **This is your opportunity to ask questions**
 - **Written questions are permitted, but all questions and answers will be posted to the ONR BAA website**
- **White paper questions of a business nature can be submitted by e-mail through Tuesday, 21 February 2017**
 - **All questions and answers will be posted to the ONR BAA website, FedBizOpps, and Grants.gov.**



ONR Discovery & Invention

ONR BAA 14-006 Points of Contact



Technical

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